DOCUMENT RESUME

ED 211 843 CE 031 237

AUTHOR Luft, Vernon D.; Backlund, Paul
TITLE Introduction to Horticulture. Unit A-10.
INSTITUTION North Dakota State Board for Vocational Education, Bismarck.; North Dakota State Univ., Fargo. Dept. of Agricultural Education.
PUB DATE Oct 81
NOTE 72p.; For related documents see ED 205 696-699 and ED 190 812-814.

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Agricultural Education; Agricultural Skills; Behavioral Objectives; *Horticulture; Instructional Materials; *Landscaping; Learning Activities; Occupations; *Ornamental Horticulture; *Plant Growth; Secondary Education; Trees; *Turf Management; Vocational Education
IDENTIFIERS *Gardening; Shrubs

ABSTRACT

Intended to provide about 10 hours of instruction to first-year vocational agriculture students, this instructional unit introduces students to the horticulture industry, provides a broad background of horticultural practices, and covers many skills that can be directly applied by students in their projects. Topics of the individual sections of the unit are examining the field of horticulture; establishing and maintaining lawns; planting, pruning, and maintaining trees and shrubs; planting and growing a garden; and beautifying homes and farms. Included in each section are the objectives of the section, guide questions, references, an interest approach, key facts, and student learning activities. Transparency masters are included in each section. Among the activities suggested are projects involving guest speakers, field trips, actual hands-on experiences, and participation in a student farmer's market cooperative. (Other units in this series are available separately--see note.) (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED211843

INTRODUCTION TO HORTICULTURE

Unit A-10

by

Dr. Vernon D. Luft - Project Manager
Paul Backlund - Graduate Assistant

Department of Agricultural Education
North Dakota State University
Fargo, North Dakota

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Vernon D. Luft

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

October 1981

In cooperation with
North Dakota State Board for Vocational Education
Carrol E. Burchinal, State Director
900 East Boulevard
Bismarck, North Dakota 58505

CE 031 237

ACKNOWLEDGEMENTS

This unit was developed from a resource unit prepared by Ronald Mueller as a requirement for Agricultural Education 497.

Individual Study

Appreciation is also given to the following persons who reviewed and recommended changes in the draft copy of the unit.

Richard Debertin - Vocational Agriculture Instructor, Berthold High School, Berthold, North Dakota.

Greg Thompson - Vocational Agriculture Instructor, Williston High School, Williston, North Dakota.

Gary Straquadine - Vocational Agriculture Instructor, Dickinson High School, Dickinson, North Dakota.

Further appreciation is given to those institutions who granted permission for the use of artwork in developing transparency masters.

Cooperative Extension Service, North Dakota State University, Fargo, North Dakota.

Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota.

INTRODUCTION TO HORTICULTURE

Jobs Included

1. Examining the Field of Horticulture.
2. Establishing and Maintaining Lawns.
3. Planting, Pruning, and Maintaining Trees and Shrubs.
4. Planning and Growing a Garden.
5. Beautifying Homes and Farms.

Intended Use

This unit is intended to provide about ten hours of instruction to first year vocational agriculture students introducing the horticulture industry and giving a broad background of horticultural practices. Many of the skills can be directly applied by first year students in their projects.

Unit Objectives

1. To develop an understanding of the functioning of the horticulture industry.
2. To develop the ability to establish and maintain lawns.
3. To develop the ability to establish and maintain trees and shrubs.
4. To develop the ability to plan and grow a garden.
5. To develop the ability to beautify the home and farm.

References

Askew, Robert G. and Stephen R. Mills. Everybody's Garden Guide. Cooperative Extension Service, North Dakota State Universtiy, Fargo, North Dakota, May 1977.

Janick, Jules. Horticultural Science. San Francisco, California: W. H. Freeman and Company, 1972.

Landscape Your Home. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, March 1969.

Lawn and Landscape Design. Agricultural Extension Service, University of Minnesota, St. Paul, Minnesota, August 1981.

Nursery Business. Elm Grove, Wisconsin: Brantwood Publications, Inc., September 1980.

Pruning Shrubs. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, June 1976.

Pruning Trees. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, May 1979.

Richardson, William B., and Gary E. Moore. Working In Horticulture. New York, New York: McGraw Hill Book Company, 1980.

Trees and Shrubs. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, April 1974.

Weed Control in Lawns. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, June 1978.

Your Lawn - It Can Be Beautiful. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, April 1979.

Job 1: Examining the Field of Horticulture.

Objectives:

The objectives of this job shall be met at a level predetermined by the instructor. The manner in which they are evaluated shall also be determined by the instructor.

Upon completion of this job, the students shall be able:

1. to list the areas included in horticulture.
2. to be familiar with the occupational areas of horticulture.
3. to understand the importance of the horticulture industry.

Guide Questions:

1. What is horticulture?
2. What are the occupations in horticulture?
3. Why is horticulture important?

References:

Janick, Jules. Horticultural Science. San Francisco, California: W. H. Freeman and Company, 1972.

Nursery Business. Elm Grove, Wisconsin: Brantwood Publications, Inc., September 1980.

Richardson, William B., and Gary E. Moore. Working In Horticulture. New York, New York: McGraw Hill Book Company, 1980.

Interest Approach:

Bring to class enough apples, nuts, or other horticultural crop and give to the students to eat. Ask them if they know the difference between that and the crops grown in this area. Explain that it is a horticultural crop and that horticulture emcompasses a broad field of fruits, vegetables, and ornamentals. Point out that horticultural crops use extensive labor and less land than agronomic crops.

Key Facts:

I. Defining Horticulture.

A. Science of growing fruits, vegetables and ornamental plants.

B. One segment of plant agriculture along with agronomy and forestry. (Transparency 1)

1. Use of the plant is what determines which field it would be under.

2. Corn grown for grain is agronomy, corn grown for human consumption is horticulture.

3. Trees grown for wood is forestry, trees grown for landscaping is horticulture.

II. Areas of Horticulture.

A. Ornamentals.

1. Floriculture.

a. Growing, distributing and selling flowers and foliage.
b. Most common in larger metropolitan areas.

1) California.
2) Florida.
3) Ohio.
4) Pennsylvania.
5) New York.
6) Colorado.
7) North Carolina.

c. Plants may be grown outdoors or indoors in greenhouses.

2. Nursery.

a. Growing, harvesting and selling a wide variety of woody plants.
b. Work includes planting, pruning, fertilizing, irrigating, spraying, and weed control.

3. Landscaping.

a. Design and construction of landscape plans.
b. Maintenance of landscapes.

4. Turf grass.

a. Production, installation, and maintenance of turf.
b. Work includes mowing, fertilizing, sodding, seeding, pest control and irrigation.
c. Wide variety of lawns included.

1) Homes.

2) Commercial and industrial sites.
3) Parks.
4) Golf courses.
5) Cemeteries.
6) Athletic fields.
7) Highway ditches.
8) Airfields.

B. Fruit production.

1. Includes production of apples, cherries, oranges, pears, peaches, and other fruits.

2. Also related industries such as orange juice industry.

3. Two basic functions.

a. Production.

1) Workers - pruning, pest control, disease control, harvesting.
2) Manager - decision maker.

b. Marketing.

1) Packaging.
2) Pricing.
3) Storage.
4) Transportation.
5) Selling.

C. Vegetable production.

1. Similar to fruit production.

2. Most is produced by large commercial firms.

3. Truck farms and farmers' markets are becoming more popular.

D. Arboriculture.

1. Cultivation of trees and shrubs.

2. Includes planting, transplanting, fertilization, disease control, pruning, bracing and general care.

3. Overlaps somewhat with nursery operations.

4. Arboriculture usually involves larger trees and shrubs.

E. Career levels found in most horticulture businesses. (Transparency 2)

1. Entry-level position - basic skills.

2. Intermediate position - increased experience and education.

3. Supervisor - directs workers.

4. Manager - makes business decisions.

III. Importance of Horticulture.

A. Major source of food.

1. 40% of our food supply is from horticulture.

2. Horticultural crops are a major source of many vitamins and minerals.

3. Home gardens are becoming more popular.

B. Aesthetic.

1. Landscapes, parks, and flowers provide beauty in cities and homes.

2. Large boom in horticulture industry due to the increased number of plants used in interior decorating for homes and offices.

C. Educational and avocational.

1. Becoming an important recreational pastime.

2. Used in retirement homes, mental health institutions and other similar agencies to promote physical and mental activity.

D. Economic.

1. Exceeds $2.5 billion annually in the U.S.

2. Employs over 100,000 individuals in the U.S.

3. Top 5 states account for over half of U.S. production.

a. Florida.
b. California.
c. Texas.
d. Pennsylvania.
e. New York.

4. North Dakota.

a. Exceeds $4 million annually.
b. 42 nurseries covering 500 acres.

Student Learning Activities:

1. Have the students each select a specific occupation in horticulture and report on the duties, education requirements, working conditions, etc. of the job.

2. Show any of the following films.

   North Dakota State Film Library, Division of Independent Study, Fargo, North Dakota.

   - Produce - From Farm To Market

   - The National Arboretum

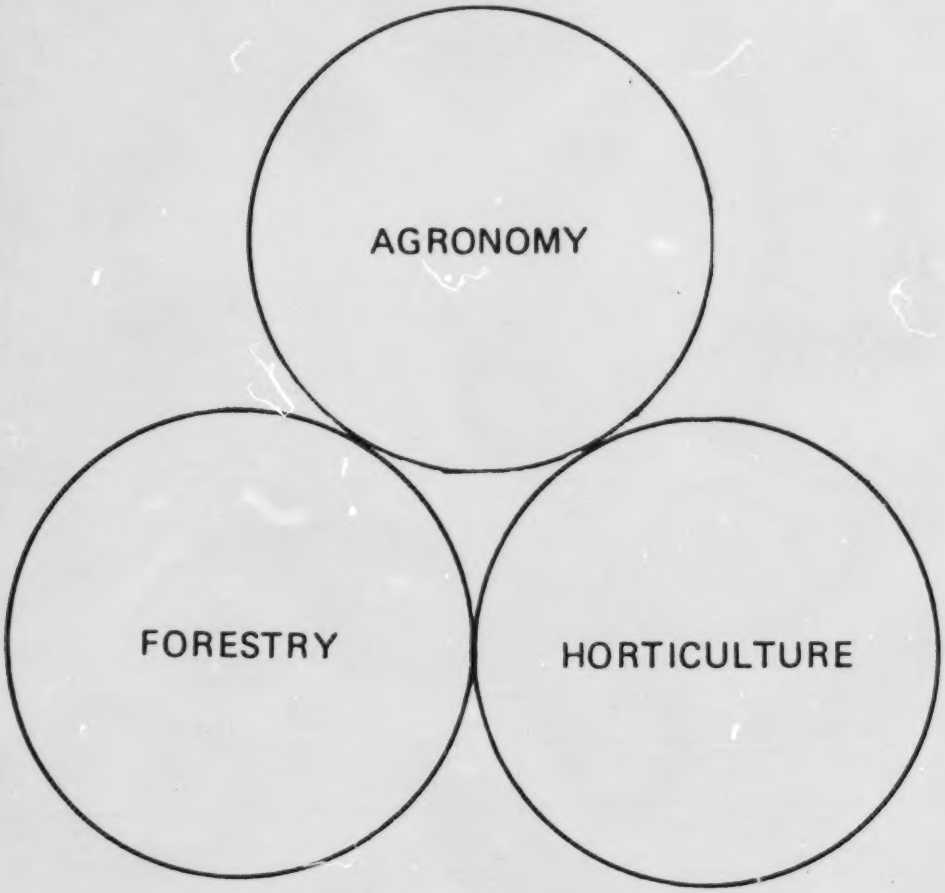
   Modern Talking Picture Service, Inc.
   New Hyde Park, New York.

   - Golden Harvest

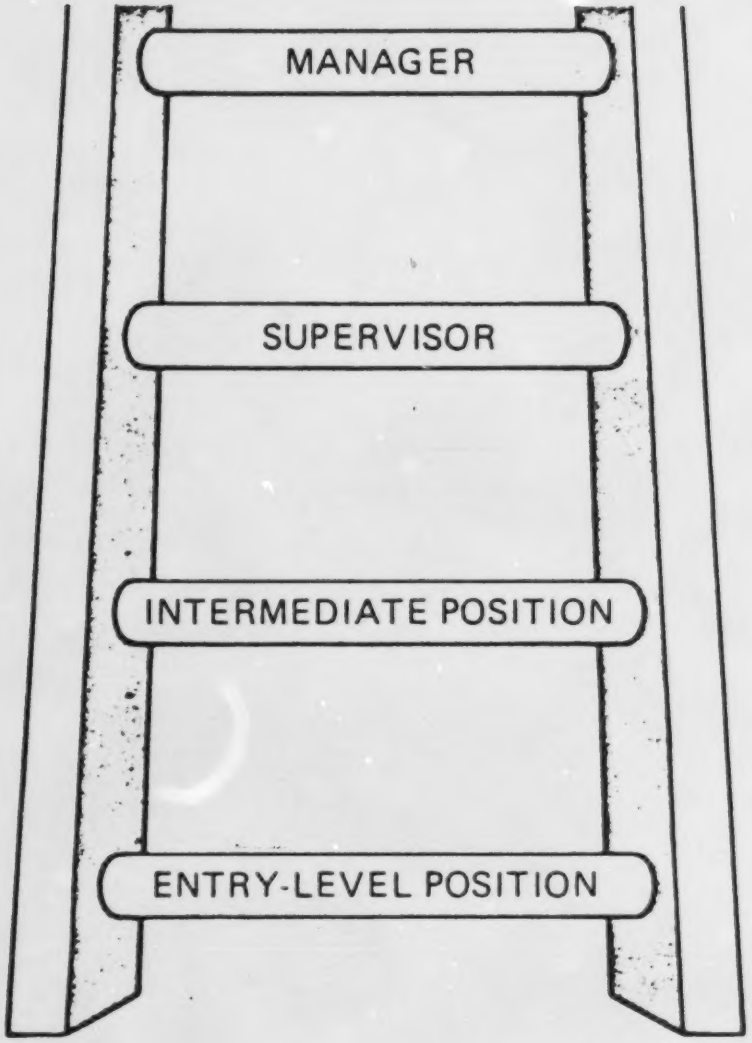
   - The Fruit of Imagination - Canned Bartlett Pears

3. Have the students look through a phone book, possibly from a larger city, and list types of horticultural businesses and their scope in the area.

THREE SEGMENTS OF PLANT AGRICULTURE



CAREER LEVELS IN THE HORTICULTURE INDUSTRY



Job 2: Establishing and Maintaining Lawns.

Objectives:

The objectives of this job shall be met at a level predetermined by the instructor. The manner in which they are evaluated shall also be determined by the instructor.

Upon completion of this job, the student shall be able:

1. to prepare soil for seeding or sodding lawns.
2. to select species of lawn seed.
3. to sow lawn seed.
4. to distinguish between sodding and seeding.
5. to describe the procedure involved in Hydro-turf.
6. to properly mow lawns.
7. to properly water lawns.
8. to properly apply fertilizers.
9. to list advantages of lawn aeration to control weeds in lawns.
10. to control insects in lawns.

Guide Questions:

1. How should the soil be prepared for seeding or sodding?
2. What are the lawn species most used in lawn seed?
3. What is the proper procedure in seeding a lawn?
4. What are the advantages and disadvantages of sodding over seeding?
5. How is Hydro-turf done?
6. When should lawns be mowed?
7. How much water should be applied to lawns?
8. When should fertilizers be applied?
9. What does aeration do to the soil?

10. What are the methods used in controlling weeds?

11. What insects create a problem in lawns?

References:

Weed Control in Lawns. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, June 1978.

Your Lawn - It Can Be Beautiful. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, April 1979.

Interest Approach:

Ask the students how often they mow their lawn in the summer or how they determine when to cut it. Ask them at what length it should be cut and how short to cut it. Ask them if it should be watered in the morning, afternoon, or evening and whether a light watering often or a heavier watering less often is best. Generate mixed debate before proceding on to actual turf management.

Key Facts:

I. Preparing the Soil Surface for Seeding or Sodding.

A. Topsoil should be 15 cm. (6 in.).

1. Save topsoil from basement sites.

2. Acquire from farmers.

3. Acquire from a fresh water swamp.

B. Soil should be high in phosphorus.

1. Use a high phosphate fertilizer (18-46-0).

2. Apply at the recommended rates.

3. Work it down into the root zone.

C. Surface should be smooth.

1. Garden rake.

2. Drag.

D. Slope away from home for drainage.

II. Selecting Lawn Seed.

A. Kentucky bluegrass.

1. Most desirable turf grass for North Dakota lawns.

2. Has a good root system.

3. Adapts well to the climate.

4. Lawn seed should have 50-60% of Kentucky bluegrass.

5. Select the variety for your needs.

   a. Common - used for average lawn situations.
   b. Elite - used for high quality athletic turf.

B. Creeping Red Fescue.

1. Most desirable companion grass with Kentucky bluegrass.

2. Has better shade and drought tolerance than Kentucky bluegrass.

C. Nurse grasses.

1. Short-lived perennial or annual grasses used for establishing lawns.

2. Mixtures should not contain more than 10-20 percent.

3. Reduce slope erosion and protect slower germinating permanent grass seedlings from drying out.

4. Annual or perennial ryegrass are the preferred species.

D. Warm season grasses are used further south.

III. Sowing or Seeding the Lawn Seed.

A. Seed the proper amount.

1. 1-1.5 kg. per 100 sq. meters (2-3 lb. per 1000 sq. ft.) is adequate if it is primarily Kentucky bluegrass.

2. 1.5-2 kg. per 100 sq. meters (3-4 lbs. per 100 sq. ft.) if seed contains 30 to 40 percent Creeping Red Fescue.

B. When to seed lawns.

1. Lawns are best seeded in early fall.

   a. Annual weeds are not a problem.
   b. Evaporation is less.
   c. Erosion due to heavy thundershowers is less likely.

2. Lawns can be grown between May 10 and September 15 if conditions are right.

a. If sown after September may suffer winter kill.
b. During July to mid-August more irrigation is needed.

C. Sowing the seed.

1. Sow seed evenly on a calm day.

2. Divide seed into two equal parts and then seed twice in different directions.

3. Rake the seed into the soil.

4. Water thoroughly after seeding.

a. Never allow seedbed to dry out during the germination period.

b. Water 2-3 times a day for 20 minutes on warm, sunny, or windy days.

5. Seed should germinate in 10 to 12 days if conditions are right.

IV. Sodding and Plugging Lawns.

A. Description.

1. Sodding - sod is grown commercially and then laid in long strips over the soil.

2. Plugging - small pieces of sod, 5-10 cm (2-4 in.), are spaced across the seedbed and eventually fill in and cover the entire lawn.

B. Advantages and disadvantages.

1. Sodding.

a. Turf is established almost immediately.
b. Can be used where erosion is a problem.
c. Can be used where it is difficult to get seedlings established.
d. Can be done at any time during the growing season.
e. Expensive.
f. Good sod is not always available.

2. Plugging.

a. Less expensive.
b. Can be used to improve existing lawns.
c. Takes longer to establish than sodding.

C. Procedure for sodding.

1. Requires the same soil preparation as a seeded lawn.

2. Lay the sod immediately upon arrival on moist soil.

a. First row should be a straight line across the width.
b. In the next row, stagger the end joints as if laying bricks.
c. Do not stretch the sod during the laying process.
d. If laying on a slope, work from the lowest point up to the top.
e. Lay strips across, not up and down the slope.
f. Water sod immediately after laying.

V. Hydro-turf.

A. Commercial method of seeding.

B. Wood cellulose fiber, grass seed and fertilizer are mixed with water and sprayed on the prepared lawn surface in a slurry by a commercial applicator.

C. Seed could be sown on soil surface and hydro-mulch applied after sowing.

D. Advantages of Hydro-turf.

1. The wood cellulose fiber serves as a mulch and helps retain moisture.

2. They are successful on slopes or steep banks.

E. Disadvantage is that it must be done commercially.

VI. Mowing the Established Lawn.

A. New or established lawns should be adjusted to approximately 5 cm. (2 in.).

1. Mow when the length reaches 7.5 cm. (3 in.).

2. Close clipping weakens the grass plants since it removes most of the leaves. Do not remove more than 40 percent of the vegetation.

3. Height cutting of 5 cm. (2 in.) provides a shady, cooler soil surface.

4. Check the height with the mower on a sidewalk or driveway.

B. Keep mower blades sharp.

1. A dull blade tends to chew rather than cut.

2. Dull blades leave a "gray hair" effect on the lawn.

C. In late summer and fall, extend mowing intervals to allow grass to store up food.

D. In late October lawns can be cut shorter.

1. Facilitates fall and spring raking of leaves.

2. Reduces damage from diseases like snowmold during late winter.

E. Grass in shaded areas may be mowed less frequently.

1. Mow at a 6 cm (2 1/2 in.) height.

2. Maintains lawn vigor and density.

F. Thatch or clippings from mowing should be removed if they become abundant.

1. Should be removed if they can not filter down between blades.

2. Can lead to lawn diseases.

3. Light clipping should be left on the lawn.

a. Helps conserve moisture.
b. Decayed clippings act as fertilizer..

G. The best method of weed control is having a healthy turf.

VII. Watering Lawns.

A. Soak lawn until the soil is moistened to a depth of 13-15 cm (5-6 in.).

1. Apply 2.5-5 cm (1-2 in.) of water each time.

2. Lawns need approximately 2.5 cm (1 in.) per week.

a. Set a can under fall-out area of sprinkler to determine the amount.
b. Determine how much water you put on in a certain length of time.

B. Apply water early in the day to reduce plant diseases.

C. Hot dry summers will cause Kentucky bluegrass - Red Fescue lawns to enter dormancy if not watered.

VIII. Fertilizers.

A. Complete lawn fertilizers contain nitrogen, phosphorus and potassium.

1. Example of a commercial brand would be 22-5-9.

a. 22% nitrogen (N).
b. 5% phosphorus (P).
c. 9% potassium (K).

B. Fall and spring are the best times to fertilize.

1. In the spring it is done preferably during May 25 to June 10.

2. Fall fertilizer should be applied between September 15-30.

3. Fertilizing from mid-July to mid-August is not recommended due to heat and drought stress.

4. Lawn fertilization recommendations.

5. If irrigation is practiced, fertilization requirements will be higher due to leaching.

C. Lawn fertilizer spreaders obtain even distribution of fertilizer.

1. Spreading evenly by hand is difficult and often results in "patchy colored" lawns.

2. Apply when grass is dry and then water the fertilizer in thoroughly.

D. Types of spreaders.

1. Drop box - fertilizer falls to the ground.

2. Whirly bird or cyclone - fertilizer is flung out by a spinning disk.

IX. Aerating Soils.

A. Involves opening the soil to allow penetration of water, oxygen and nutrients to develop deeper and more vigorous roots.

B. If you use a mechanical aerator, select one that removes a plug of soil.

1. Moist soils are necessary for satisfactory operation.

2. Do not use on sandy soils.

X. Weed Control.

A. Eradicate or destroy any perennial weeds before sowing.

1. Field bindweed.

2. Canada thistle.

3. Quack grass.

B. Annual weed infestations can be controlled by grass competition and mowing.

C. Do not apply any herbicide on new lawns till the grass has reached the three to five leaf stage.

D. Know which weeds you are controlling with chemicals.

1. No single chemical is successful on all species of weeds.

2. Read labels carefully and follow the manufacturer's directions.

3. Use only amine or oil soluble amine forms.

4. Be careful not to let spray drift to plants other than weeds.

5. Apply herbicides early in growing season to kill weeds before they flower.

6. Most favorable temperature is between 18-30° C. (65-85° F.).

a. Higher temperatures cause injury to vegetation.
b. Lower temperatures have an effect on the activity of the herbicide.

7. Apply on a calm day.

E. Select the proper herbicide for the problem. Check with the salesman, cooperative extension agent, or other expert.

F. Some weeds may be pulled. Be sure to include the root. Deep-rooted weeds may be severed several inches below the ground and pulled.

G. Some products include both herbicide and fertilizer.

XI. Insects.

A. They are not generally a serious problem.

B. Ants and white grubs create minor problems.

Student Learning Activities:

1. Show any of the following films:

   Home Lawns - Cooperative Extension Service, North Dakota State University, Fargo, North Dakota.

   Lawn Mower Safety - North Dakota State Film Library, Fargo, North Dakota.

   Mowing Lesson for Charlie - Creative Visuals Service, Iowa Farm Bureau Federation, W. Des Moines, Iowa.

   Lawn Mower Safety - Farm Film Foundation, Washington, D.C.

2. Have each student take responsibility of his/her lawn at home or at least part of it. They should perform the following duties:

   - rake the lawn when needed.

   - check and set the mower height.

   - check lawn height and determine when to mow.

   - determine when to water and check amount applied.

   - control weeds.

3. Have the students visit a golf course or other professionally managed lawn to observe turf management practices. Be sure to point out that those are not necessarily the same practices to be used on their lawn at home.

4. Have the students observe some type of lawn establishment, seeding or sodding. If possible, have the students do some kind of lawn establishment; around the school yard, park or some other public building may be some possibilities. Students could start a small square of turf indoors and then use it as sod or plugs at home in places where the lawn needs improvement.

Job 3: Planting, Pruning and Maintaining Trees and Shrubs.

Objectives:

The objectives of this job shall be met at a level predetermined by the instructor. The manner in which they are evaluated shall also be determined by the instructor.

Upon completion of this job the students shall be able:

1. to plant trees and shrubs.
2. to prune trees and shrubs.
3. to maintain trees and shrubs.

Guide Questions:

1. What is the correct procedure in planting trees and shrubs?
2. What is the correct procedure in pruning trees and shrubs?
3. How should trees and shrubs be maintained?

References:

Trees and Shrubs. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, April 1974.

Pruning Trees. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, May 1979.

Pruning Shrubs. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, June 1976.

Interest Approach:

Ask the students for reasons why they get their hair cut. Shaping, thinning, and shortening should be the type of answers given. Point out that the same thing should be done with trees and shrubs so their appearance is improved. Also point out the importance of other practices in tree and shrub care.

Key Facts:

I. Planting Trees and Shrubs.

A. Bare root plants. (Transparency 1)

1. No media or soil around the roots when purchased.
2. Most economical to buy.
3. Purchase only material which is dormant, no swollen buds.

4. Difficult to store and establish, because the roots must be protected.

   a. Keep moist packing material around the roots.
   b. Store plants in a cool place out of the sun and wind.

5. Examine the condition of the stock upon arrival.

6. Plant as soon as possible.

   a. Plant in early spring before growth starts.
   b. If you wait too long, you should prune at planting time.

7. Soak overnight before planting but not over 24 hours.

8. Dig a hole that is 15 cm (6 in.) deeper and wider than the root spread.

9. Prune or cut off damaged or weak roots and branches.

10. Put a mound of good topsoil in the hole and spread the roots out on it.

11. Plant it slightly deeper than grown in nursery.

12. Fill with good topsoil.

13. Fill basin with water.

14. Add topsoil to reshape basin.

15. Supporting larger trees.

    a. Drive stake 20 cm (8 in.) or more from trunk.
    b. Use open loop or wire covered with old hose to protect trunk.

B. Balled and burlapped plants. (Transparency 2)

1. Plant material dug with a ball of soil and placed in burlap.

   a. Root system stays essentially intact.
   b. Evergreens are commonly handled and sold in this manner.

2. Plant in early spring before growth starts or in late fall.

3. Dig out a hole bigger than the rootball.

4. Add good topsoil in the bottom of the hole.

5. Plant 5 cm (2 in.) deeper than ground level.

6. Cut the twine tie around the plant stem.

7. Loosen the burlap and fold back but do not remove.

8. Partially fill the hole and make sure the burlap gets covered.

9. Add more soil after settling.

10. Reshape the basin.

11. Water regularly.

C. Potted plants. (Transparency 3)

1. Plant material has been grown in a container for less than one year.

   a. Local nurserymen obtain bare-root stock and pot prior to spring sale.
   b. Potted stock can be planted throughout the growing season.

2. Dig a good sized hole slightly lower than the plant in the pot.

3. Lay the pot on its side and cut or tear the bottom out.

4. Slit one side of the pot.

5. Place one hand on the open bottom to hold soil, and hold the pot together with the other.

6. Set the pot in the hole.

7. Fill the hole with loose soil.

8. Gently slip pre-cut pot-ring out.

9. Add more soil, pack firm and water.

D. Container grown plants. (Transparency 4)

1. Stock has been grown in a container at least one year.

2. Can plant throughout the growing season.

3. Dig the hole before removing container.

4. Remove the container.

   a. Tapered cans should be turned upside down and tap the rim sharply on a raised edge surface.

b. Straight cans should be cut on opposite sides and folded back.

5. Plant slightly below the ground level on a firm mound of topsoil.

6. Backfill with topsoil and tamp the soil.

7. Add more soil after settling and reshape the basin.

8. Water regularly.

E. Transplanting trees.

1. Pick well formed trees.

2. Dig a ditch around the tree 1 year prior to removal, to allow for a tighter root formation.

3. Transplant in spring before buds swell or in the fall.

4. Dig tree carefully to save as many roots as possible.

5. Wrap tree roots and dirt in damp burlap to prevent drying out.

6. Plant tree as soon as you arrive at the place of planting.

7. Unwrap the tree and spread roots out.

8. Dig the hole wide and deep enough to accommodate the roots when they are stretched to natural length.

9. Replant the tree at the same depth as grown.

10. Fill the hole with water.

11. Add topsoil and build a wall of earth around the hole.

12. Stake the tree down.

13. Water weekly.

14. Take the extra soil back to the hole where the tree was dug.

II. Pruning Trees and Shrubs.

A. Purpose.

1. Obtain certain shape.

2. Remove dead, injured, or diseased branches.

3. Limit size.

4. Improve vigor.

5. Control disease and insect damage.

B. Evergreens. (Transparency 5)

1. Junipers, cedars, and arborvitae may be cut any time.

   a. Preferably between April and mid-August.
   b. Trim anywhere but do not cut beyond the living foliage.
   c. Use a hedge shears on compact trees.
   d. Use a hand shears or knife on others.

2. Pines are only pruned in late spring when the buds have elongated and the needles are growing in length.

   a. Can be cut with pruners.
   b. Can be broken off with the fingers.

3. Spruces should be pruned every year or at 2-year intervals.

   a. Cut back last year's new branches to one of the lateral or side buds.
   b. Best time is just before new growth begins in the spring.
   c. Prune by cutting or breaking off part of the new succulent growth.

4. If leader on top branch is broken or failed to develop, bend the nearest shoot into position where the leader should be with a brace.

5. Points to remember when pruning evergreens.

   a. Leave lower limbs on the tree if they are alive.
   b. Avoid severe pruning in late summer or fall.
   c. Avoid pruning beyond live forage.
   d. Prune trees often, preferably once a year.

C. Shade trees.

1. Should be pruned during early spring before they are in full leaf. (Transparency 6)

   a. Remove crowded branches.
   b. Remove weak crotches.
   c. Remove dead branches.

2. Pruning established birch and maple should be delayed until trees are in full leaf to prevent bleeding.

3. Branches under 2.5 cm (1 in.) in diameter can be removed flush with the main branch or tree trunk.

4. Removing larger limbs over 2.5 cm (1 in.) should be done in three cuts

   a. Make a cut on the under side 30 cm (1 ft.) out from trunk and at least one-fourth through the branch.
   b. Second cut is made on top side 2.5-5 cm (1-2 in.) farther out than the first cut and cut all the way through.
   c. Third cut is made flush with the trunk, cutting off remaining stub.

D. Shrubs.

1. Heading back. (Transparency 7)

   a. Removing the end portion or new shoots.
   b. Stimulates the growth of new shoots.
   c. Produces a more dense plant.

2. Thinning. (Transparency 8)

   a. Removing a branch back to its origin on the stem.
   b. Least conspicuous method.
   c. Results in a more open plant.

3. Spring is the best time to prune woody plants in northern climates.

4. At transplanting time all small shrubs should be pruned back within 7.5 cm (3 in.) to 14 cm (6 in.) of the ground.

5. Large shrubs should be pruned to 50 percent of their size.

6. Deciduous shrubs should be pruned according to flowering habit.

   a. Early flowering shrubs - cut out very old stems to ground level after blooming.
   b. Late flowering shrubs - cut all shoots 2 years old and older at the ground line.

7. Avoid removing one-third of total stem.

8. If shrub becomes old and leggy, cut all the stems to the ground in early spring.

III. Maintaining Established Trees and Shrubs.

A. Watering.

1. Only during extreme dry spells of 3-4 weeks.

2. Apply as much water as the soil can absorb.

3. Do not water again until the surface is dry or at least one week.

B. Fertilizing.

1. Not likely needed during the first year.

2. Recommended if growth seems stunted or leaves are paled.

3. Trees.

a. Measure the diameter of the trunk 1 meter (3 ft.) above the ground.
b. Use .5 kg for each cm (2 lb./in.) for trees over 7.5 cm (3 in.) of 5-10-5 fertilizer.
c. Use .1 kg for each cm (1/2 lb./in.) for trees under 7.5 cm (3 in.).
d. Use a soil auger, crowbar, or posthole digger to make holes 40 to 60 cm (15-24 in.) deep and 45 to 60 cm (18-24 in.) apart around the drip line of the tree.
e. Make additional holes inside the circle up to 30 cm (1 ft.) from the tree.
f. Make holes outside the drip line so new growth will be fertilized.
g. Distribute the fertilizer equally among the holes.
h. Fill the holes with soil.

4. Shrubs.

a. Scatter fertilizer over the root area.
b. Scratch it into the surface with a rake.
c. Use 1 to 2 handfuls depending on the size of the shrub.

Student Learning Activities:

1. Have each student plant a tree at home or in some public area such as a park. This could be an Arbor Day project.

2. Have the students prune a tree or shrub at home, school yard or other source.

3. Bring in the local nurseryman to explain the different prices and buying procedures of the plants.

4. Have the students look at various trees and shrubs in the community to compare which ones have been properly pruned and maintained.

PLANTING BARE ROOT PLANTS

SOAK OVERNIGHT

SPREAD ROOTS OVER TOPSOIL

FILL WITH TOPSOIL AND WATER

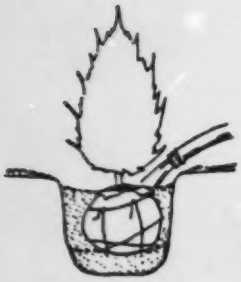
SUPPORT TREE WITH STAKE

Courtesy of the Cooperative Extension Service, North Dakota State University.

PLANTING BALLED AND BURLAPPED PLANTS

DIG HOLE TO PROPER SIZE

LOOSEN BURLAP AND FOLD BACK



FILL WITH TOPSOIL AND WATER

ADD MORE SOIL AND SHAPE BASIN

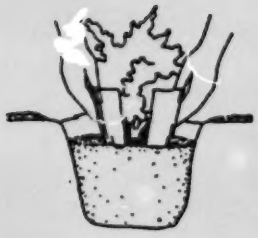
Courtesy of the Cooperative Extension Service, North Dakota State University.

PLANTING POTTED PLANTS

DIG HOLE TO PROPER SIZE

SLIT SIDE AND REMOVE BOTTOM OF POT

CAREFULLY SET PLANT IN HOLE



FILL WITH SOIL AND REMOVE POT

Courtesy of the Cooperative Extension Service, North Dakota State University.

PLANTING CONTAINER GROWN PLANTS

REMOVE CONTAINER

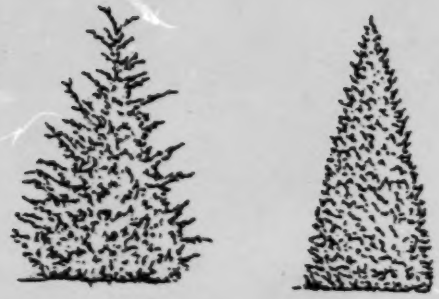
SET ON FIRM SOIL SLIGHTLY BELOW GROUND LEVEL

FILL WITH TOPSOIL AND WATER

ADD MORE SOIL AND SHAPE BASIN

Courtesy of the Cooperative Extension Service, North Dakota State University.

PRUNING EVERGREENS



BEFORE AFTER

JUNIPERS, CEDARS, AND ARBORVITAE
MAY BE CUT ANYTIME

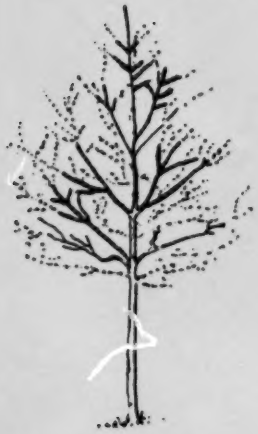
REMOVE THE BUD ON
PINES IN LATE SPRING

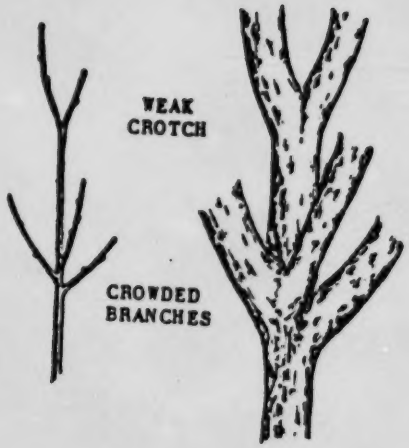
CUT SPRUCES BACK TO SIDE BUDS

REPLACE BROKEN LEADER
WITH NEAREST SHOOT

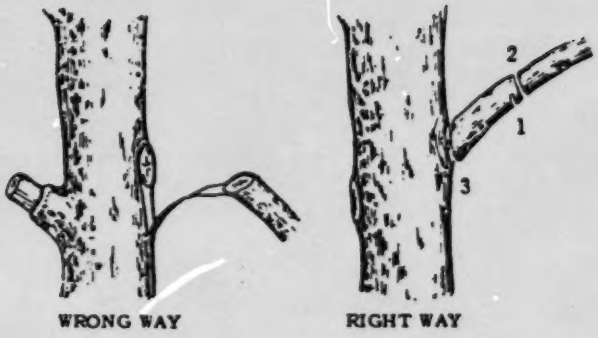
Courtesy of the Cooperative Extension Service, North Dakota State University.

PRUNING SHADE TREES





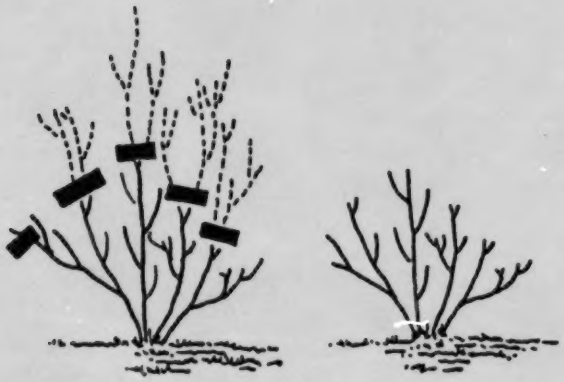
METHOD OF PRUNING BACK SHADE TREE



REMOVE LARGE LIMBS WITH THREE SEPARATE CUTS

Courtesy of the Cooperative Extension Service, North Dakota State University.

HEADING BACK SHRUBS



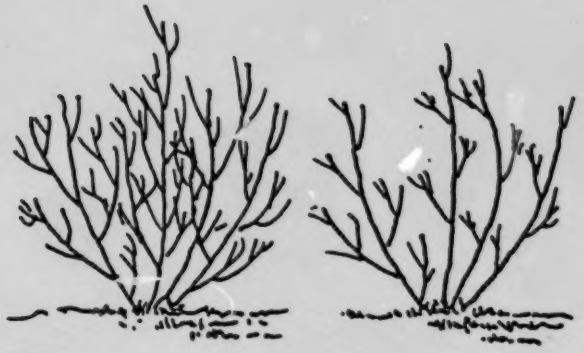
BEFORE AFTER

WRONG RIGHT WRONG RIGHT

CUT BACK TO A BRANCH OR BUD

Courtesy of the Cooperative Extension Service, North Dakota State University.

THINNING SHRUBS



BEFORE AFTER

REMOVE THE BRANCH BACK TO THE STEM

WRONG RIGHT

COMBINED THINNING AND HEADING BACK PRODUCES A SHAPELY SHRUB

Courtesy of the Cooperative Extension Service, North Dakota State University.

Job 4: Planning and Growing a Garden.

Objectives:

The objectives of this job shall be met at a level predetermined by the instructor. The manner in which they are evaluated shall also be determined by the instructor.

Upon completion of this job, the students shall be able:

1. to select a good location for a garden.
2. to plan a garden.
3. to prepare soil for planting.
4. to plant a garden.
5. to thin, weed, and water a garden.
6. to maintain soil fertility in a garden.
7. to identify and use garden tools.

Guide Questions:

1. What are some tips for beginning gardeners?
2. Where should the garden be located?
3. How do you plan a garden?
4. How do you prepare the soil for planting?
5. How do you plant a garden?
6. What must be done to maintain a garden?
7. How is soil fertility maintained?
8. What gardening tools are needed?

References:

Askew, Robert G. and Stephen R. Mills. Everybody's Garden Guide. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, May 1977.

Interest Approach:

Distribute copies of Everybody's Garden Guide to each of the students. The key facts outline closely follows the text as well as the transparency masters. Students should read ahead to be prepared for discussion.

Key Facts:

I. Tips for the Beginning Gardener.

A. It is better to start out with a small garden; a small weed-free garden will produce more and better vegetables than a large, unkempt garden.

B. Start out by planting the easiest-to-grow vegetables and those most liked by the family.

C. Don't plant everything early because losses could result from cold wet soil or late frosts.

D. Acquire the necessary garden tools.

1. Spade.

2. Rake.

3. Hoe.

E. A well prepared seedbed is essential for good yields.

II. Locating the Garden.

A. Not too far from the house.

B. Choose a sunny location.

C. Should be well-drained, fairly level, and fertile.

D. Consider wind protection.

1. Trees.

2. Snow fence.

3. Three or four rows of sweet corn.

E. Locate away from the shade and roots of shrubs, trees, and hard to control weeds.

F. Avoid low areas.

1. Ground may stay wet and soil cool.

2. Could cause disease, or unhealthy plants.

G. Locate near a water source.

III. Planning a Garden.

A. Determine the kinds of vegetables to be planted and amount desired.

B. Map out the arrangement of crops.

1. Length of rows.

2. Spacing between rows.

C. Set your planting dates.

D. Plant tall crops on the north side to prevent shading of smaller plants.

E. Crops that require large areas in your garden.

1. Melons.

2. Vine squash and pumpkin.

3. Sweet corn.

F. Crops that produce a lot in a small space.

1. Potatoes.

2. Onions.

3. Peas.

4. Tomato.

5. Radish.

6. Lettuce.

7. Beans.

8. Bush squash or pumpkin.

9. Peppers.

G. Space can be saved and the harvest spread out with good planning.

1. Use successive planting to spread out the harvest.

a. Delay some rows 1-2 weeks so fresh vegetables are available for a longer period.
b. Beets, cabbage, onions, and peas have a short harvest season.

2. Use interplanting to use the same space twice.

a. Early and late crops can be planted together.

b. The early crop is harvested before the late one reaches full growth.
c. Early crops include lettuce, onion sets, and radishes.
d. Late crops include tomatoes, peppers, cabbage and parsnips.

IV. Preparing the Soil.

A. Soil contains many things.

1. Minerals.

2. Decaying leaves.

3. Air.

4. Water.

5. Waste materials.

6. Very small plants and animals.

B. Proper care of garden soil makes it productive.

1. Keep soil loose and healthy.

2. Fall management.

a. Use a rotary lawn mower to chop old vegetable plant remains.
b. Spread compost or rotted manure.
c. Plow, spade, or roto-till deeply, 20-25 cm (8-10 in.) after harvest.
d. Water will seep better into soil that has been loosened.

3. Spring management.

a. Apply even layer of compost, rotted manure or dry fertilizer.
b. Roto-till or spade 10-15 cm (4-6 in.).
c. Wait until soil is dry enough before working.

1) Squeeze a handful of soil, if it stays in a mudball, it is too wet, if it crumbles it is dry enough.
2) Working wet soil may cause it to dry very hard.

V. Planting the Garden.

A. Making rows.

1. Lay out rows lengthwise.

2. Attach a heavy string to two stakes.

3. Set a stake at each end of the row.

4. Use the string to mark the row across the length of the garden.

5. Move the stakes and string along when ready to make the next row.

B. Preparing the seedbed.

1. Use a garden rake to level and smooth the soil along the row.

2. Rake clods between rows where they will break down.

3. Avoid walking on the rows.

C. Sowing seeds.

1. Use a hoe to make a furrow along the string line. (Transparency 1)
   a. Use the handle for small seeds.
   b. Use the blade for large seeds.

2. Check the seed packet for planting depth.
   a. Plant shallower in wet or heavy clay soil.
   b. Plant deeper in dry or light sandy soil.

3. Place seeds along the furrow. (Transparency 2)
   a. Place large seeds one at a time.
   b. Tap small seeds from the packet or take a pinch and sprinkle it. Plant fairly thick as they can be thinned later.

4. Cover seed with moist soil and gently tamp with a rake, hoe, or your hand.
   a. Keeps soil from drying out.
   b. Seed touches moist soil for better germination.

5. If soil is dry, water after planting.

D. Using transplants.

1. May be purchased or begun at home or school.

2. Use stocky, well-grown plants, avoid tall spindly ones.

3. Starting indoors.
   a. Punch drain holes in the bottom of a horizontally-cut milk carton or shallow pan.

b. Fill 3/4 full of well-drained soil.
c. Sow seeds thinly, cover lightly with soil and water thoroughly.
d. Cover with a newspaper and place in a pan or tray in a warm spot, 21-24° c (70-75° F.)
e. Remove newspaper as soon as seedlings begin to emerge, and place in a well lighted window.
f. Be careful not to overwater.
g. Move the seedlings to another container when they have developed their first true leaves. Allow adequate space.

4. Transplanting.

a. Reduce watering for 4-5 days and place outdoors for a few hours each day to prepare the plants.
b. Plant on a cloudy day, after a rain, or late in the afternoon.
c. A fertilizer solution may be used to get plants off on a faster start.

VI. Maintaining the Garden.

A. Thinning.

1. Thin plants to allow room for growth and better quality plants. (Transparency 3)

2. Pull out smaller plants when they are 2.5-5 cm (1-2 in.) tall. Hold the soil firm around neighbor plants, so they are not damaged. (Transparency 4)

3. Plants with larger spacings may be thinned with a hoe.

4. Thinned plants may be used to fill in bare spots if they are not damaged.

5. Watering afterwards may help if soil is dry.

B. Weeding.

1. Small weeds may be scraped off at the surface with a sharp hoe.

2. Large weeds should be pulled out by the roots when the soil is moist.

3. Weeds will dry up and die if removed in the heat of the day.

4. Do not water after weeding as they may re-root.

5. Do not let weeds go to seed, even if the garden has been harvested. They will be a problem next year.

6. Mulches may be used to control weeds and conserve moisture.

   a. Plastic.
   b. Lawn clippings.
   c. Leaves.
   d. Straw.
   e. Paper.

C. Watering.

1. Rainfall is the best source of moisture.

2. One watering of 2.5-5 cm (1-2 in.) per week is usually adequate during dry periods.

3. Soil should be moist down to 15-30 cm (6-12 in.) after watering.

4. Do not water again until the top few inches have dried.

5. Light watering should be avoided as the roots do not grow deep. (Transparency 5)

6. Use care not to wash away soil when watering.

7. Avoid leaving water on leaves overnight.

   a. Leaves will have greater chance of disease.
   b. Water in morning.
   c. Let water trickle down the row.

8. Non-watered gardens require special attention.

   a. Good fertility.
   b. Wind protection.
   c. Good weed control.
   d. Lack of root competition.
   e. Proper row spacing.
   f. Proper thinning.

VII. Soil Fertility.

A. Components of fertilizer. (Transparency 6)

1. Nitrogen - promotes leaf growth.

2. Phosphorus - promotes fruit and flower growth.

3. Potassium or potash - promotes root growth.

B. Fertilizer analysis.

1. Fertilizers are labeled using 3 numbers.

a. First is percent nitrogen.
b. Second is percent phosphorus.
c. Third is percent potash.

2. Fertilizers with high analysis are generally a better buy. (Transparency 7)

3. Common garden fertilizers are fairly balanced.

a. 5-10-5.
b. 5-10-10.
c. 18-24-6.

4. Lawn fertilizers are mostly nitrogen and not suitable for gardening.

a. 33-0-0.
b. 20-10-10.

C. Match fertilizers to the type of vegetable grown.

1. Nitrogen - lettuce, cabbage.

2. Phosphorus - tomatoes, peas, beans, cucumbers.

3. Potash - carrots, radishes, beets.

D. Spreading fertilizer.

1. Spread in fall or spring before working soil.

2. Several methods of applying.

a. Spreader.
b. Sprinkle by hand.
c. Place in furrows 5 cm (2 in.) deep, 7.5 cm (3 in.) on both sides of the rows.

3. Use gloves to protect your hands from irritating chemicals.

4. Use only the amount recommended on the label, too much may kill the plants.

5. Compost.

a. Used to add organic matter and keep soil loose.
b. Made up of many things.

1) Straw.
2) Grass clippings.
3) Manure.
4) Plant remains - leaves, stems, vines.

c. Analysis of organic matter is generally low (2-3-2), so much is needed to compare with inorganic fertilizers.
d. Locate the compost pile in an out-of-the-way spot near the garden.
e. A fence can be used to hold the pile. (Transparency 8)
f. Start with 15-30 cm (6-12 in.) of organic matter.
g. Add a thin layer of soil and moisten if dry.
h. Keep alternating layers until 1 meter (3 ft.) high.
i. Do not get the pile too wet, only moist. Check every 2-3 weeks and moisten if necessary.
j. Watering is easier if the pile slopes to the middle.
k. Decomposition may be speeded up.

1) Turn the pile once per month.
2) Add barnyard manure.
3) Add a high-nitrogen, complete fertilizer.

1. Spread the compost over the garden when it has decomposed, 3-12 months.

VIII. Gardening Tools.

A. Types.

1. Hoe - digging trenches and removing weeds.

2. Metal rake - leveling soil for seedbed and cleanup.

3. Spade or spading fork - turning over soil, adding compost and harvesting underground crops.

4. Hand trowel - transplanting and small digging.

5. Roto-tiller - turning over soil. (May be rented if garden is large enough to need one.)

B. Care.

1. Use a file to keep the hoe sharp for easier cutting and digging.

2. Keep all tools clean and dry.

3. Oil metal lightly at the end of the season to prevent rusting.

4. Apply linseed oil to handles.

Student Learning Activities:

1. Have the students select a plot and plan a garden for their home. Students should look through seed catalogs to select varieties to grow.

2. Have the students start some plants indoors. These can be later used by the students or sold to the community.

3. Students should be responsible for a section of the family garden if one is available. A cooperative garden may be used by students if land is available. Students should be responsible for all aspects including working the soil, planting, thinning, weeding, water, and harvesting. This could be used as part of their SOEP and students could have garden improvement as an Improvement Project.

4. Have students observe various types of gardening tools, different types of hoes, different spades, etc. The students should compare differences and relate to use. The students should also bring a hoe to sharpen.

5. Students could participate in a student farmers' market cooperative to sell vegetables.

Courtesy of the Cooperative Extension Service, North Dakota State University.

Courtesy of the Cooperative Extension Service, North Dakota State University.

Courtesy of the Cooperative Extension Service, North Dakota State University.

THIN PLANTS TO ALLOW ROOM FOR
GROWTH AND BETTER QUALITY PLANTS

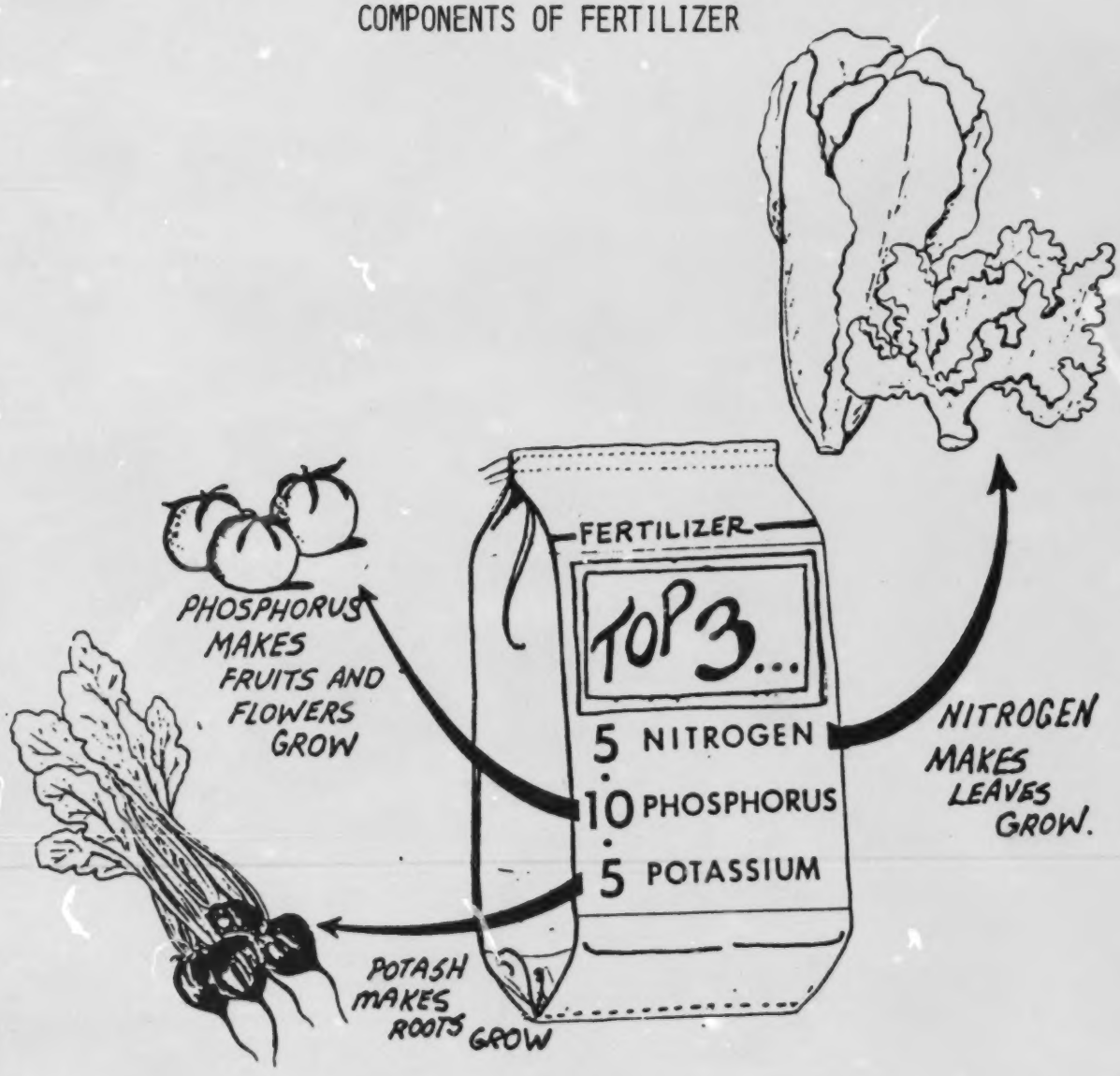
54

Courtesy of the Cooperative Extension Service, North Dakota State University.

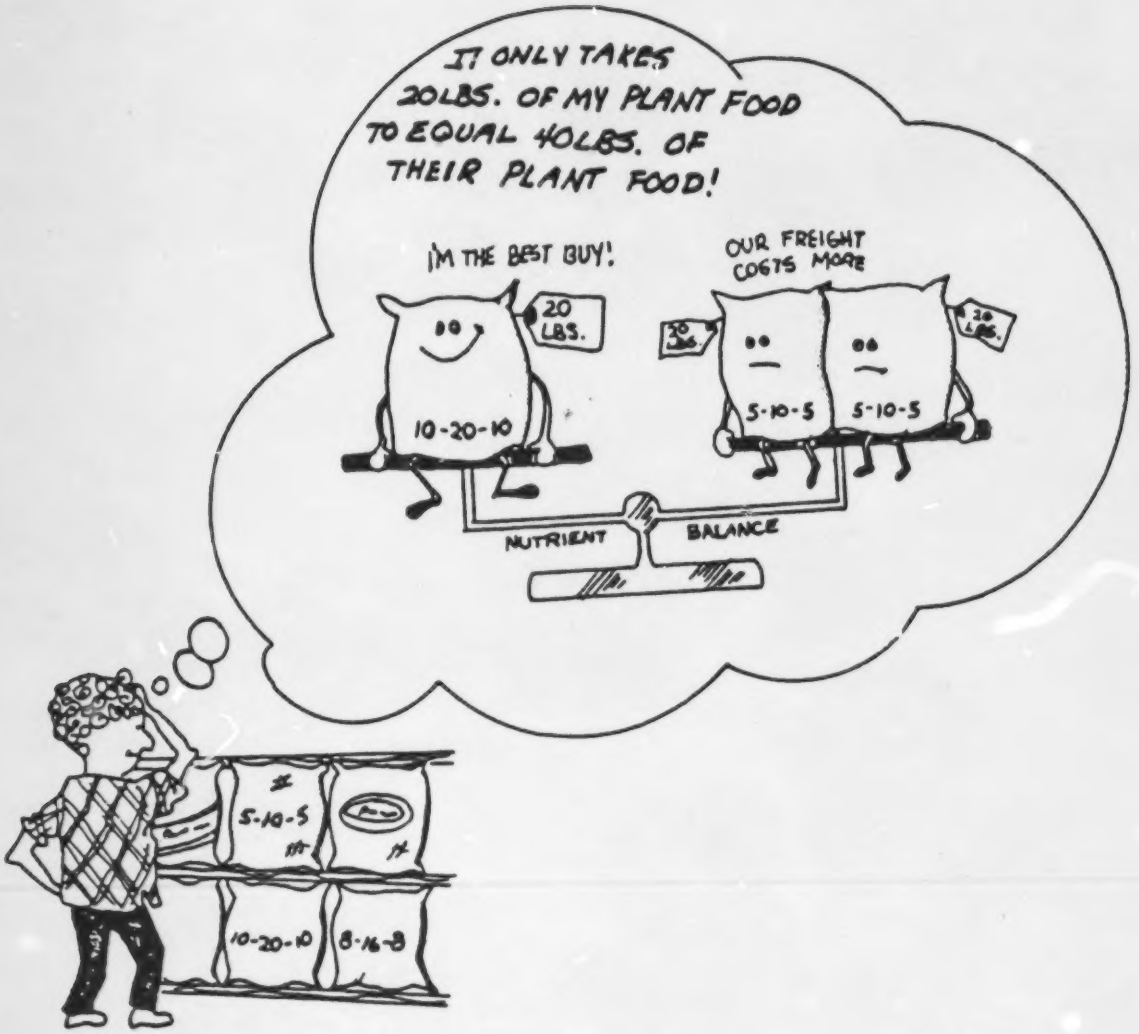
53

Courtesy of the Cooperative Extension Service, North Dakota State University.

COMPONENTS OF FERTILIZER



Courtesy of the Cooperative Extension Service, North Dakota State University.

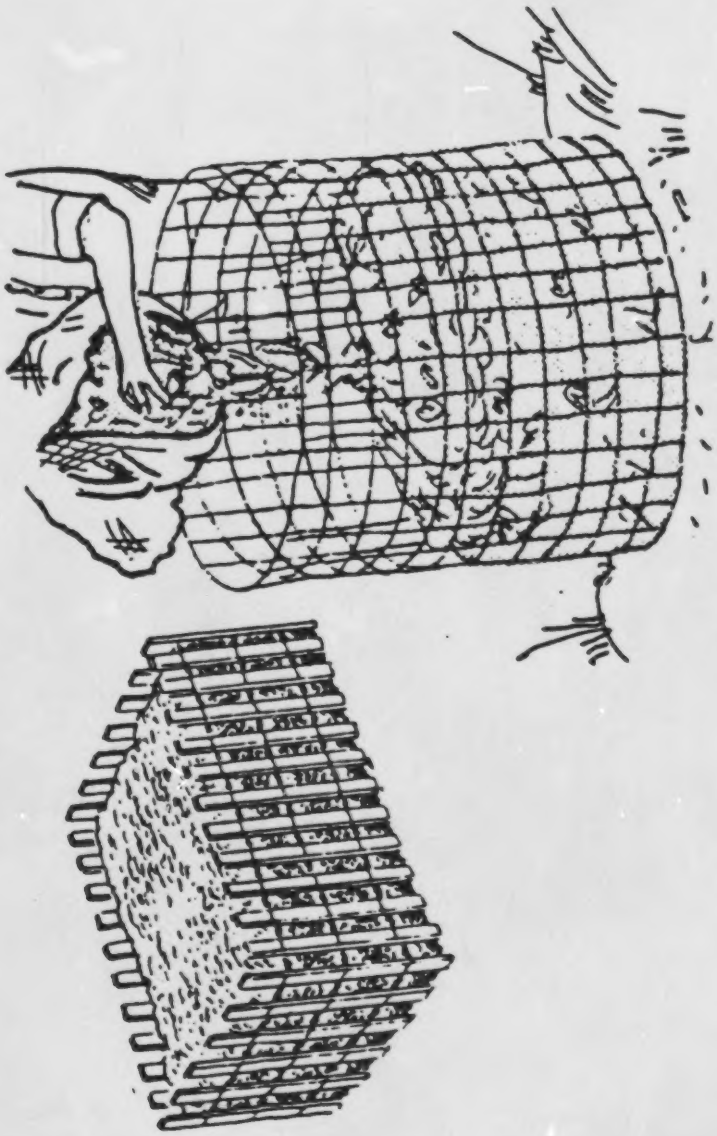


FERTILIZERS WITH A HIGH ANALYSIS ARE GENERALLY A BETTER BUY

Courtesy of the Cooperative Extension Service, North Dakota State University.

60

USE A FENCE TO HOLD THE PILE



Courtesy of the Cooperative Extension Service, North Dakota State University.

59

Job 5: Beautifying Homes and Farms.

Objectives:

The objectives of this job shall be met at a level predetermined by the instructor. The manner in which they are evaluated shall also be determined by the instructor.

Upon completion of this job, the students shall be able:

1. to list ideas for improving the home.
2. to list ideas for improving the yard.
3. to list ideas for improving the farmstead.

Guide Questions:

1. How can you improve the home?
2. How can you improve the yard?
3. How can you improve the farmstead?

References:

Landscape Your Home. Cooperative Extension Service, North Dakota State University, Fargo, North Dakota, March 1969.

Lawn and Landscape Design. Agricultural Extension Service, University of Minnesota, August 1981.

Interest Approach:

Ask the students to name some homes, yards, farms, and businesses that are attractive. Have them list specific things that make these different.

Key Facts:

I. Ideas for Improving the Home.

A. Interior.

1. Add some house plants to various rooms.

a. Living room.
b. Kitchen.
c. Bathroom.
d. Den.
e. Bedroom.
f. Stairways.

2. Paint where needed.

3. Add lights in dark areas.

B. Exterior.

1. Paint the house.

2. Repair eaves.

3. Fix broken windows.

4. Replace shingles.

5. Weatherstrip doors and windows.

II. Ideas for Improving the Yard.

A. Lawn.

1. Fertilize.

2. Eliminate weeds.

3. Eliminate insects.

4. Aerate.

5. Reseed thin areas.

6. Take a soil sample.

B. Trees and shrubs.

1. Add some foundation plants. (Transparency 1)

a. Corner shrubs.
b. Ground cover.

2. Plant a shade tree in the back yard.

3. Plant border plants along the edge of the yard. (Transparency 2)

a. Shrub fence or hedge.
b. Tree row.

4. Prune trees and shrubs.

5. Plant a fruit tree.

C. Other plants.

1. Plant a flower garden.

2. Plant a vegetable garden.

3. Put vines up on a trellis next to the house or other building. (Transparency 3)

D. Structures.

1. Put in a sidewalk, walkway or patio. (Transparency 4)
2. Build a deck.
3. Build a planter for small shrubs or flowers.
4. Build some bird houses or feeders.
5. Build a small shed for garden tools and other things to be stored out of sight.
6. Build a retaining wall. (Transparency 5)
7. Add some outdoor lighting.
8. Put in a rock garden.
9. Make a play area for younger children.
10. Put up a fence. (Transparency 6)

III. Ideas for Improving the Farmstead.

A. Paint buildings and fences.

B. Remove weeds and keep grass mowed.

C. Park equipment neatly in proper place.

D. Clean up junk piles.

E. Improve drainage.

F. Establish a windbreak.

G. Keep different areas separated. (Transparency 7)

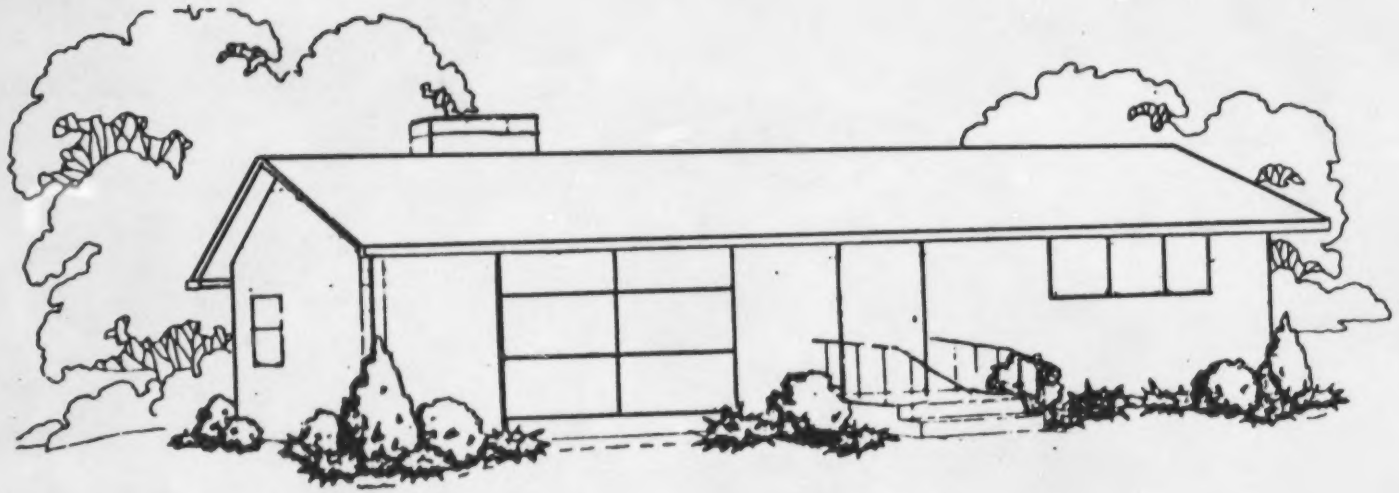
1. Machinery storage and repair.
2. Fuel, chemical, and fertilizer storage.
3. Grain storage and handling.
4. Livestock.

Student Learning Activities:

1. Have each student develop a plan to improve his or her home and farm, making a list of activities to be performed. Each student could use this as an Improvement Project.

2. Show the film, Color The City Green, from the North Dakota State Film Library, Division of Independent Study, Fargo, North Dakota.

3. Sponsor a contest to weekly pick a yard of the week. Divisions could be set up for city and farm, east and west sides of town, etc. Make a sign for the winning yard and utilize the local paper for publicity.



ADD SOME FOUNDATION PLANTS AROUND THE HOUSE

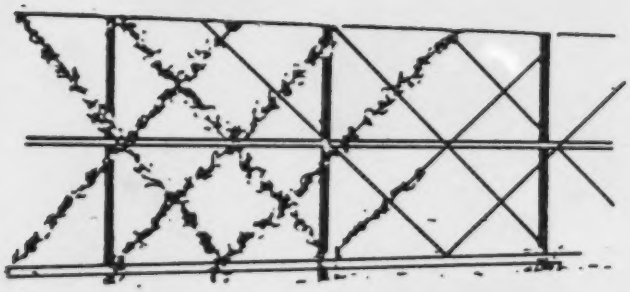
Courtesy of the Cooperative Extension Service, North Dakota State University.

PLANT A HEDGE AS A BORDER

OR USE TREES AND SHRUBS

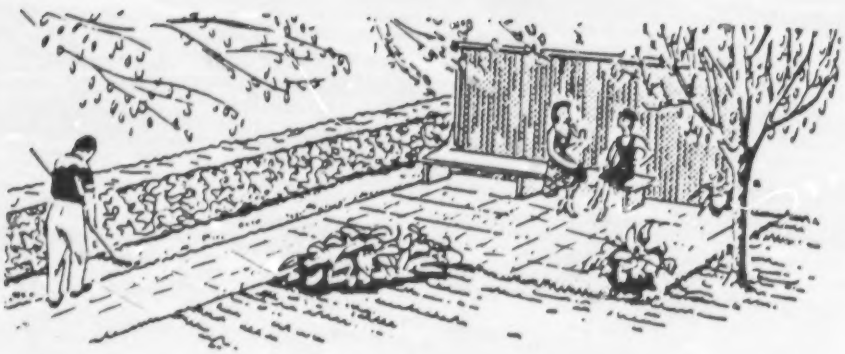
Courtesy of the Agricultural Extension Service, University of Minnesota.

PUT VINES UP ON A TRELLIS NEXT
TO THE HOUSE OR OTHER BUILDING

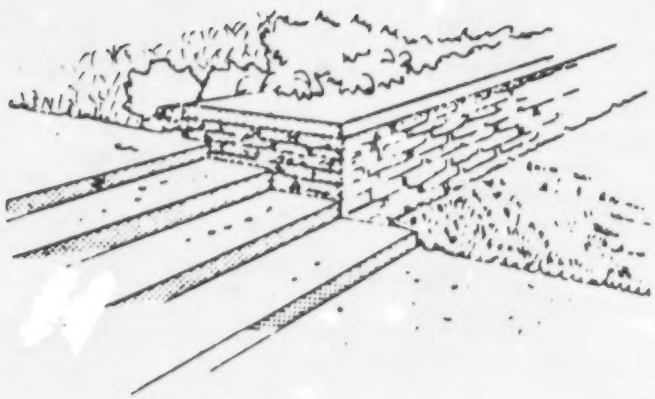


Courtesy of the Agricultural Extension Service, University of Minnesota.

PUT IN A SIDEWALK, WALKWAY, OR PATIO



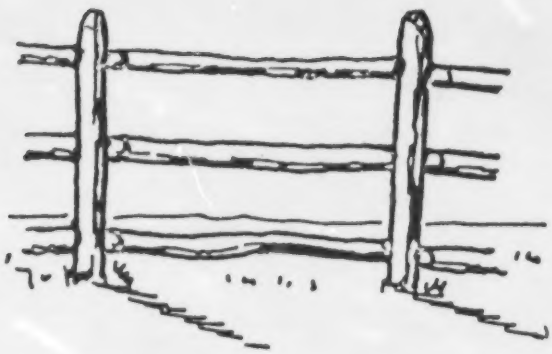
Courtesy of the Agricultural Extension Service, University of Minnesota.

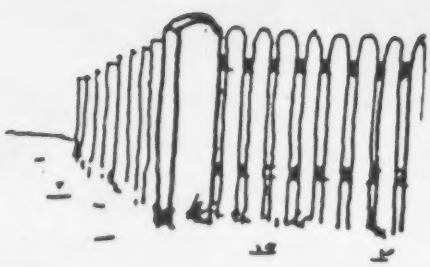


BUILD A RETAINING WALL WHERE GROUND IS UNLEVEL

Courtesy of the Agricultural Extension Service, University of Minnesota.

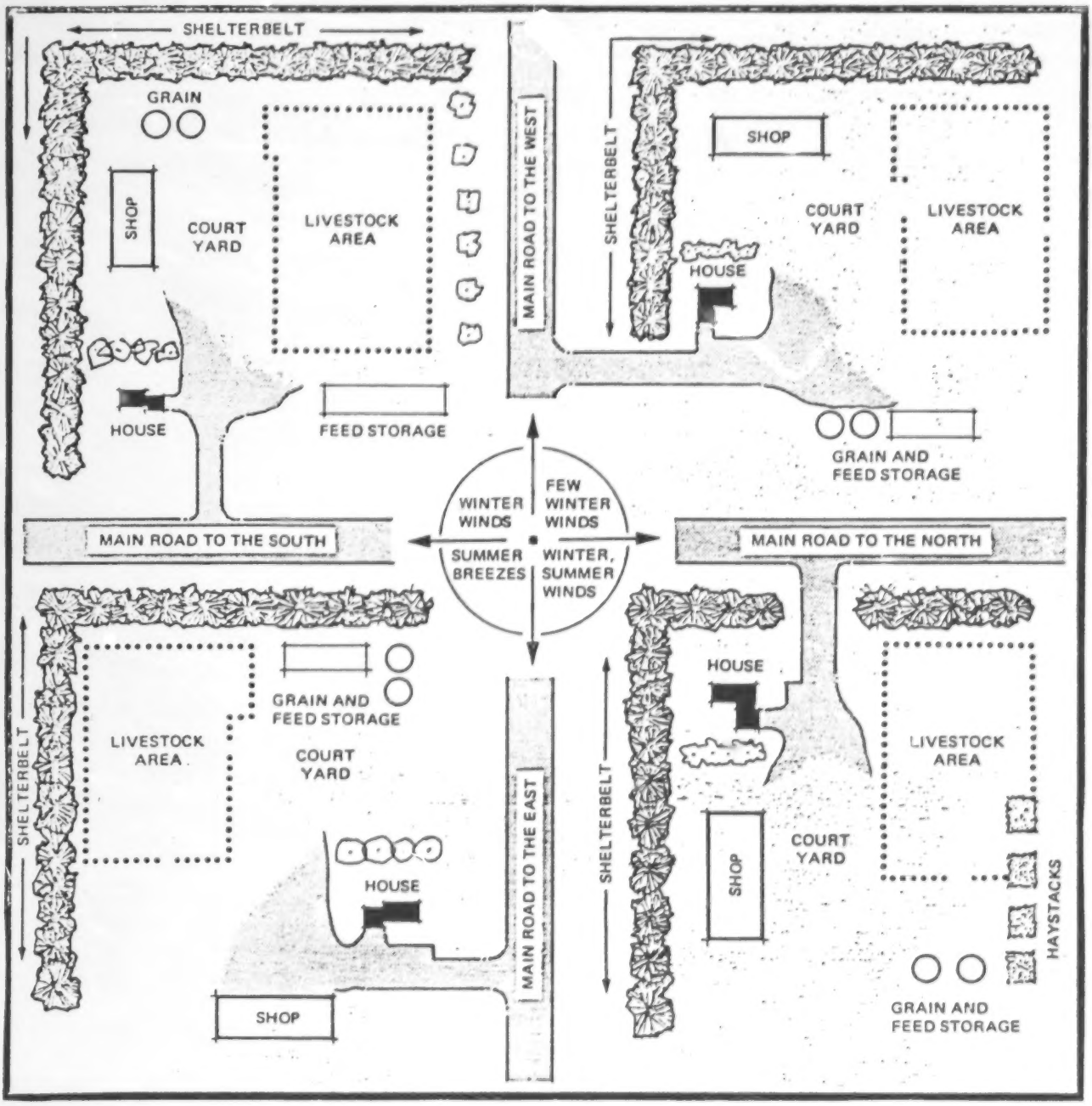
VARIOUS TYPES OF FENCES





Courtesy of the Agricultural Extension Service, University of Minnesota.

KEEP DIFFERENT USE AREAS SEPERATE ON THE FARM



Courtesy of the Cooperative Extension Service, North Dakota State University.